

**FY-2002 SCOPE OF WORK for:**  
Colorado River Basin Channel Monitoring

Project #: 85 C

Lead Agency: Water Acquisition Committee

Submitted By: George Smith  
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Principal Investigator: Doug Osmundson (303) 970-245-9319

<u>Category:</u>	<u>Expected Funding Sources:</u>
<input type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input checked="" type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new start	
<input type="checkbox"/> Other (explain)	

I. Title of Proposal:

Upper Colorado River Basin Channel Monitoring

II. Relation to RIPRAP:

<u>Task #</u>	<u>Task Description</u>
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**Colorado River Action Plan: Mainstem**

I.A.3.c(3)(c)ii) Implement, evaluate process & hydrology, and provide annual report (on Coordinated Reservoir Operations)

III. Study Background/Rational:

During the past eight years, a cooperative channel monitoring effort has proven to be successful in shedding new insight on top habitat-dependent processes and issues. This approach has resulted in a considerable amount of information being collected and analyzed at a relatively low cost to the Recovery Program. The approach has taken advantage of previous efforts and has capitalized on cooperative efforts, available data, and expertise within the Recovery Program to provide information used to develop flow recommendations and design habitat improvement projects. That part of the channel monitoring program for FY-2002 covered in this scope of work is designed to:

- a. Continue monitoring depth-to-embeddedness and invertebrate biomass at each of 16 sites along the Colorado River in the Grand Valley.

IV. Study Goals:

The goal of the channel monitoring program is to support the efforts of the Recovery Program in identifying historical trends, developing flow recommendations, restoring flooded bottom lands, and monitoring physical conditions of the rivers in the Upper Colorado River Basin.

V. Study Area:

The Colorado River in the 15- and 18-mile reaches of the Grand Valley in Colorado.

VI. Study Method/Approach:

In the Grand Valley, baseline data for cobble embeddedness was acquired during 1996-1997 (Osmundson and Scheer 1998) and was continued in 1998. In 1999, a formal 10-year monitoring program began. So far, monitoring has been conducted in 1999 and 2000. In 2001, invertebrate monitoring at the embeddedness study sites was begun. This work will continue as planned through 2008. The embeddedness monitoring program consists of taking 20 measurements of depth-to-embeddedness at each of 16 sites in the Grand Valley on five sampling dates each year. In addition, three invertebrate samples are collected with a modified Hess sampler at each site on four of the dates (base flow). These are analyzed in the lab for total dry weight biomass.

VII. Task Description and Schedule:

1. Continue monitoring cobble embeddedness in the Grand Valley portion of the Colorado River on five sampling dates each year. Twenty measurements of depth-to-embeddedness will be taken at each of 16 sites in the Grand Valley on each date. One date will be in late March prior to runoff; one date will be on the declining limb of the spring hydrograph; and three dates will be during the late summer/early fall base flow period. Wolman pebble counts (rock size frequency distribution) will be taken at the 16 sites once yearly. The results of this work will be incorporated into the annual channel monitoring report.

2. In addition to the physical measurements, invertebrate sampling will be conducted at each of the sites on the three summer/fall baseflow sampling dates as well as the one early spring date. A modified Hess sampler will be used to collect invertebrates. Three samples will be collected at each embeddedness sampling site (3 samples x 16 sites x 4 dates = 192 samples per year). Total biomass of invertebrates will be analyzed in the lab. This information is critical to quantifying the biological link between physical substrate characteristics and food base production. To date, we have only year-to-year data on changes in substrate embeddedness in relation to discharge, but do not have the data to quantify how these changes affect invertebrate production

and ultimately the carrying capacity for the fish community. This additional sampling will allow us to discern year-to-year changes in invertebrate production and relate these changes to depth-to-embeddedness and flow regimes.

3. Prepare draft and interim 5-year summary report.

4. Prepare draft and final summary report.

Schedule: Task 1 and 2: 2002-2008

Task 3: 2006

Task 4: 2009

FY-2002 Work (year 1 of multi-year study):

Deliverables/Due Dates: Prepare annual report (12/2002)

Budget estimate

Task 1. 10,000 (labor and equipment)

Task 2. 8,000 (\$5,760 lab analysis [\$30/sample]; \$2,240 field labor)

FY-2003 Work (year 2 of multi-year study):

Deliverables/Due Dates: Prepare annual report (12/2003)

Budget estimate

Task 1. 10,500 (labor and equipment)

Task 2. 8,494 (\$6,144 lab analysis [\$32/sample]; \$2,350 field labor)

FY-2004 Work (year 3 of multi-year study):

Deliverables/Due Dates: Prepare annual report (12/2004)

Budget estimate

Task 1. 11,000 (labor and equipment)

Task 2. 8,614 (\$6,144 lab analysis [\$32/sample]; \$2,470 field labor)

FY-2005 Work (year 4 of multi-year study):

Deliverables/Due Dates: Prepare annual report (12/2005)

Budget estimate

Task 1. 11,500 (labor and equipment)

Task 2. 9,128 (\$6,528 lab analysis [\$34/sample]; \$2,600 field labor)

FY-2006 Work (year 5 of multi-year study):

Deliverables/Due Dates: Prepare 5-year interim report (6/2006) and annual report (12/2006).

Budget estimate

Task 1.	12,000 (labor and equipment)
Task 2.	9,258 (\$6,528 lab analysis [\$34/sample]; \$2,730 field labor)
Task 3.	4,000 (labor)

FY-2007 Work (year 6 of multi-year study):

Deliverables/Due Dates: Prepare annual report (12/2007)

Budget estimate

Task 1.	12,500 (labor and equipment)
Task 2.	9,782 (\$6,912 lab analysis [\$36/sample]; \$2,870 field labor)

FY-2008 Work (year 7 of multi-year study):

Deliverables/Due Dates: Prepare annual report (12/2008)

Budget estimate

Task 1.	13,000 (labor and equipment)
Task 2.	9,912 (\$6,912 lab analysis [\$36/sample]; \$3,000 field labor)

FY-2009 Work (year 8 of multi-year study):

Deliverables/Due Dates: Prepare final report (06/2009)

Budget estimate

Task 3.	18,000 Labor (analyses, writing)
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Annual progress reports will be prepared in December of each year; a 5-year interim progress report will be prepared 2006; finally, a draft summary report will be prepared by March 2009 and a final report readied by June 2009.

VIII. Budget Summary:

FY-2002:	Tasks 1 & 2	\$ 18,000
FY-2003:	Tasks 1 & 2	\$ 18,994
FY-2004:	Tasks 1 & 2	\$ 19,614
FY-2005:	Tasks 1 & 2	\$ 20,628

FY-2006:	Tasks 1, 2 & 3	\$ 25,258
FY-2007:	Tasks 1 & 2	\$ 22,282
FY-2008:	Tasks 1 & 2	\$ 22,912
FY-2009:	Task 4	<u>\$ 18,000</u>
	Total:	\$165,688

IX. Reviewers: Geomorphology Peer Review Panel 1998.